

the gill clefts. In the skate the spiracles play a more important part, for when the animal is at rest all the water which enters the pharynx does so by way of the spiracles; none enters by the mouth. In *Rhina squatina* (the angel-fish) no movement of the spiracles is visible; there is a uniform current of water into the mouth and spiracles, and the water is driven out again through the gill slits by the undulations of the "gill covers."

The Systematic Position of *Polypterus*.

Mr. E. S. Goodrich pointed out that *Polypterus* and *Calamoichthys*, both from the rivers of tropical Africa, forming the order *Polypterini*, have no near relations among living fish. The presence of rhomboid ganoid scales, paired gular plates, a persistent spiracular gill cleft, true clavicles, a bilobed air-bladder, and a straight tail, form a combination unknown in any other order. Owing to their lobate pectoral fins, paired gulars, rhomboidal scales, outwardly diphyceral tail, and to a considerable resemblance in the disposition of the roofing cranial bones, Huxley (1861) placed the order *Polypterini* in the group *Crossopterygii*, in which it has been left by subsequent writers, associated with such extinct forms as *Osteolepis* and *Holoptichius*; but on comparing *Polypterus* with these fossils the resemblance is by no means close. The similarity in arrangement of the surface bones of the skull is only general, and such as may be found in most primitive Teleostomes. The scales of *Polypterus* and *Osteolepis* are of very different structure, those of the former being of the true ganoid type. The tail is not truly diphyceral, but of a modified heterocercal type, the notochord, in the young at any rate, being turned upwards (as shown by Budgett). In *Actinopterygii* there may occur a median ventral gular plate as well as two lateral series; two of the anterior plates of the lateral series may be more or less enlarged, as in *Palaeoniscidae*: the paired plates of *Polypterus* may be the homologues of these plates of the *Actinopterygii*, and not of the more median plates of the *Crossopterygii*. The skeleton of the pelvic fin and girdle of *Polypterus* is much more actinopterygian than crossopterygian in structure. The resemblance of the fins of *Polypterus* to the lobate fins of the *Crossopterygii* was shown by Budgett to be superficial only. The relationship of *Polypterus* to the *Actinopterygii* is supported by a comparison of the structure of the scales and of the fins, by the presence of large solid otoliths in the ear, and the double nostrils on each side of the snout, while the brain, the alimentary canal with its pyloric cæcum, the kidneys and testes, the separate anus and urinogenital apertures, are also consistent with this view.

Colour Variations in the Skin of the Hamster.

Prof. Simroth (Leipzig) exhibited a series of skins of the hamster (*Cricetus frumentarius*), which is common in the cornfields of some parts of Germany, and especially in Thuringia. The usual coloration of the skin is grey along the back and black ventrally, these two being separated by a lateral reddish area, and there are three white or pale yellow patches at the sides of the head and breast. The skins, however, show great variations in coloration. In one series the red areas and then the white patches disappear, the upper side becomes grey, greyish-brown, and finally black, so that the whole skin is now black. In another series the under side becomes lighter, followed by a similar change on the upper side, leading finally to an albino, the rarest variation. The black specimens were first noticed during the hot summers some years ago. It is not yet clear whether these colour variations are to be attributed to climatic conditions or are atavistic.

Photographs of a Young Living Okapi.

Sir E. Ray Lankester, K.C.B., F.R.S., exhibited photographs of a living okapi taken by Signor Ribotti at Bambili, on the Welle River, in the Congo Free State. The animal is a young colt showing the striping of the upper part of the fore and hind legs and hind quarters, and the dark body colour, apparently as in the adult. It is worthy of note that this is the first time that a European has seen a living specimen of the okapi. Some doubt having been recently expressed as to whether okapi is the native name of the animal, Sir E. Ray Lankester remarked

that he had shown the photographs and a portion of a skin to some of the African pygmies, now in London, who recognised them, and at once spoke of them under the name okapi.

Plankton Investigations off the Isle of Man.

Prof. Herdman gave an account of his plankton investigations off Port Erin during April. These were undertaken with the object of testing different kinds of open and closing tow-nets, and of gaining information regarding the detailed distribution of the organisms according to locality, depth, and date. Examples were given of very different results, quantitative and qualitative, obtained from quite similar nets hauled not far apart as regards both distance and time. Sudden variations in the vertical and horizontal distribution of the plankton were discussed, and the seasonal changes were also considered; obviously great care and much observation of the gatherings of organisms are required before these can be considered as adequate samples. Prof. Herdman concluded that our methods must be investigated before the attempt to investigate nature on a large scale can be made, and also that an intensive study of small, well-chosen areas is necessary before conclusions can be drawn with regard to relatively large regions such as the North Sea or the Atlantic Ocean.

Mr. W. E. Collinge traced the rise, and pleaded for the due recognition, of economic biology; Prof. Simroth gave an account of his pendulation theory in relation to geographical distribution; Mr. J. W. Jenkinson described his further experiments on the development of the frog; Mr. T. V. Hodgson pointed out the principal features of interest in the collections of Pycnogonids from several Antarctic expeditions; and Prof. R. J. Anderson detailed his observations on the thickness of the skull in Mammalia; but these papers cannot be well summarised in the space here available.

J. H. ASHWORTH.

PHYSIOLOGY AT THE BRITISH ASSOCIATION.

THE physiological section has for several years devoted one morning to some subject of general interest. This policy was inaugurated at Cape Town by the discussion on the effect of climate upon health; it was followed up at York by one on the physiological minimum of rest for children, opened by Dr. T. D. Acland; and this year at Leicester by one on the physiological and therapeutical value of alcohol. The interest which this subject has aroused of late made it a particularly appropriate one, more especially as the matter has not been recently discussed in at all a dispassionate way. From this point of view the meeting at Leicester was all that could be desired, and perhaps the most remarkable feature in connection with it was the very narrow margin which separated those who took different views as to the value of alcohol.

The discussion was opened by Prof. Cushny, F.R.S., who reviewed the effect of alcohol on the various systems of the body, alluding especially to its very doubtful effect as a stimulant to the alimentary system, its effects upon the circulation, especially the heart, as recently worked out by Prof. Dixon, and its action upon the muscular nervous system and on the power of the body to resist toxic agents. In doing so he introduced some of the subsequent speakers. Dr. Rivers gave an extremely interesting account of the use of the ergograph in obtaining records of the effect of alcohol. It was very remarkable to see how great was the psychical element in ergograph tracings; this, indeed, was so marked that much the same effect could be obtained by giving a dose of alcohol and one which the patient thought was alcohol, or even one which merely excited his curiosity. Dr. Rivers has been able, in conjunction with Prof. Dixon, to administer considerable doses of alcohol in forms which were not recognisable, and in doing so he has found no certain beneficial effect on the power of performing muscular work. Some curves shown by Dr. Waller, F.R.S., were quite in harmony with this view. These

results admittedly supported the contention put forward by Sir Victor Horsley, F.R.S., and Miss Sturge, that the ergograph gave results which were as yet too uncertain to yield a verdict which could be considered as final.

On one point there was unanimity, namely, that alcohol even in the smallest quantities was deleterious to the

some authoritative statement of its limitations would be useful. At present this may be approached in two ways: (1) by a discussion of the best fluids for the purpose, and here we may mention the work recently done at Oxford by Dr. Vernon, who advocated the addition of albumin to Ringer's solution; and (2) by an inquiry into the organs which seem to react most readily, when perfused, to the stimuli which normally produce functional activity. Along this line Mr. Barcroft tentatively put forward the thesis that those organs the coefficient of oxidation of which is lowest stand perfusion much better than others. Thus the heart and muscle react well when perfused, whilst the glandular structures appear incapable of full functional activity when irrigated with an artificial blood supply. Such a tissue as unstriated muscle, which probably has a lower coefficient of oxidation than any of the organs mentioned, will retain a considerable degree of functional activity if it be merely suspended in warm saline solution.

A very interesting discussion followed upon the presidential address. We need not further allude to the address itself, as it has already appeared in the columns of NATURE, than to say that the president's main thesis was that every practitioner should be trained in the quantitative administration of chloroform in surgical cases with an apparatus which delivered air containing a known percentage of the anaesthetic to the patient.

FIG. 1.—Diagram showing the gradual diminution during the past forty years in the administration of alcohol and the increase in the use of milk during the same period. The figures are summarised from the statistics of seven large London hospitals.

quality of mental work. This was insisted upon, not only by Sir Victor Horsley, but by Prof. Dixon, who took a much more optimistic view of the value of alcohol. Prof. Dixon especially considered it valuable in cases of cardiac collapse, on account of the readiness with which it appears to be absorbed and assimilated.

From the point of view of the use of alcohol in the treatment of disease, Sir Victor Horsley showed curves (Figs. 1 and 2) illustrating the departure from alcohol which has taken place in the last decade, not only in hospitals generally, but in hospitals for the treatment of fevers—a class of complaints in which alcohol was previously supposed to be especially beneficial.

Still dealing with the relation of alcohol to disease, Dr. Reid Hunt gave an account of the interesting experiments that he has been conducting which point conclusively to the fact that alcohol lowers the power of resistance of the body to a certain specific toxic body, acetonitrile.

Two points remain, the dose of alcohol which may be regarded as harmless, and the much-debated question of whether alcohol is a food. These points are closely connected. The impression left on the mind at the end of the discussion was that whether alcohol is or is not a food is largely a matter of definition. It seems certain, on the one hand, that it is oxidised in the body, yielding a corresponding amount of energy—in this sense it is a food. Such a definition includes many substances—morphia, for instance—which are clearly injurious. If alcohol is not only a "food" but "a useful food," it must be shown that it can be taken without injury to the organism in sufficient quantities to supply an appreciable proportion of the energy of the body. This has not yet been done.

Tuesday, August 6, was devoted to a discussion upon a much more technical subject, the value of perfusions. This was introduced by Prof. Schäfer, F.R.S., who gave an exact account of the best methods for perfusing the heart and the kidney. Others who took part in the discussion were Prof. Cushing, Dr. Alcock, Prof. Zuntz, and Mr. Barcroft. Perfusion has become so important a method in physiological and pharmacological research that

This view was very warmly supported by Sir Victor Horsley and Dr. Vernon Harcourt. Dr. Frederick Hewitt pointed out the difficulties which attended the administration of chloroform in this way, which consisted partly in the impracticability of having apparatus at hand in a great number of cases, and the difficulty in using them in cases where there was great personal idiosyncrasy in

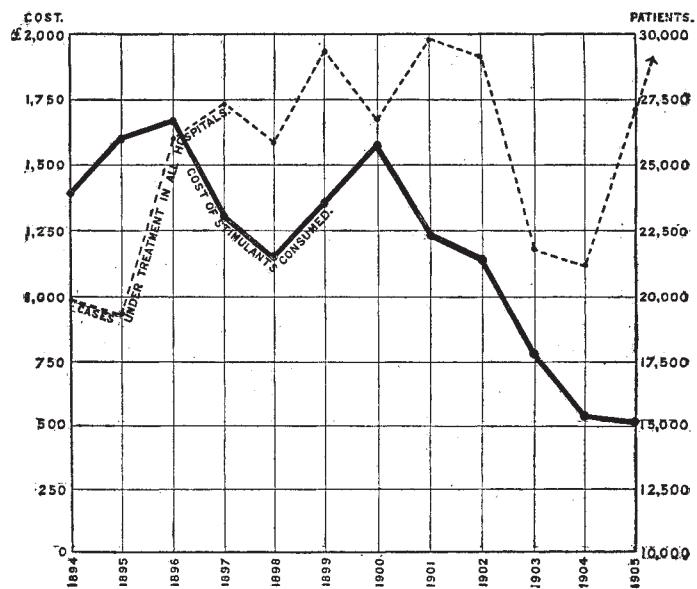
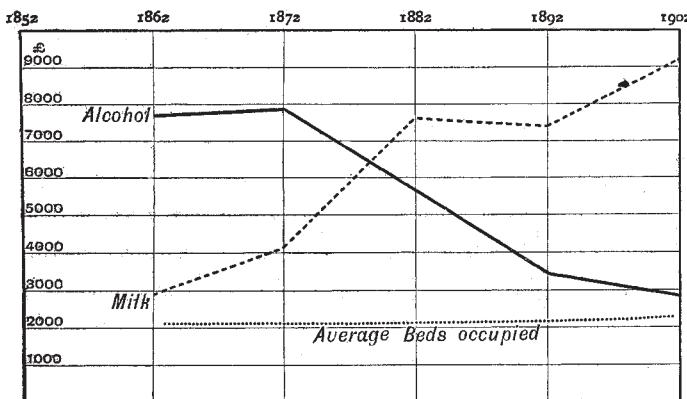


FIG. 2.—Metropolitan Asylum's Board Statistics. Diagram showing the fall in the administration of alcohol to fever patients during the years 1894 to 1905. The dotted line shows the number of patients beginning in 1894 with 20,000. The continuous black line shows the amount of money expended on alcohol beginning in 1894 with £1,388, and falling to £152 in 1905, although the number of patients in the hospitals that year was 27,162.

the patients. Prof. Waller made it clear, however, in a few words at the end that a person who had been instructed in quantitative ideas as to the administration of chloroform was in a better, not a worse, position to administer it without apparatus if need be, than the man who had only a rule-of-thumb knowledge. This view

fairly represented that of the meeting, and it was supported by Prof. Schäfer, F.R.S., Prof. Gotch, F.R.S., and others.

The individual papers were perhaps fewer than is usually the case. Prof. Sherrington, F.R.S., added another to the series of communications on the coordination of reflex muscular movements in the spinal animal which has added so much to the interest of the British Association meetings in the last few years. Very beautiful examples were shown of graded reflex movements which took place in response to graded stimuli. His experiments throw a good deal of light upon the action of strychnine. This drug appears to cause an exaggeration of the rebound which takes place normally after reflex inhibition. The inhibition may be re-established by giving chloroform. Two practical points were brought out:—(1) that in many cases the physiological units of musculature do not correspond to the anatomical ones; and (2) that there is a portion of the gluteus maximus muscle which does not respond either to ordinary reflex stimulation or to strychnine.

Papers on the physiology of nerve were read by Dr. Alcock and Prof. Macdonald. Interesting in themselves, these communications were rendered doubly so by the fact that their writers take a diametrically opposite view of the nature of the nervous impulse.

Three reports were presented by committees; they dealt, respectively, with the metabolic balance sheet of the individual tissues, the ductless glands, and the effect of climate upon health. Their work evoked more interest than usual. The afternoon was spent in discussing the report of the committee of which Sir Lauder Brunton is chairman, and which is a very strong one. It has worked very hard in its efforts to produce a schedule for the collection of the necessary data for the comparison of the climatic conditions of various localities with the diseases which are prevalent in them. Along another line the committee has been greatly strengthened by the active interest of Prof. Zuntz, who came over to Leicester and gave an account of the work which is now being inaugurated in Berlin.

Prof. Zuntz is continuing the work which he and his collaborators carried on in the high Alps, and at the present time two travellers, Drs. Schilling and Jaffé, are making a corresponding set of observations upon themselves in Togo. It will be of great interest to compare the effects of hot climate with the positive results which were obtained upon the high Alps.

J. BARCROFT.

THE KINGSTON EARTHQUAKE.

~~THE~~ official report on the Kingston earthquake, of January 14 last, by Mr. Maxwell Hall, contains, in addition to the customary compilation of accounts of time, duration and violence of the shock, some interesting records of the peculiar behaviour of the sea on the north coast of the island. At Annotto Bay and Port Maria the sea receded, about three or four minutes before the shock at Port Maria, at about the same time after it according to the account from Annotto Bay, the amount of the recession being equivalent to a vertical fall of from 12 feet to 20 feet; after the shock the sea returned in a wave which swept up the shore to 6 feet or 8 feet above its normal level. This phenomenon was only recorded at the two localities mentioned, a fact which points to its being probably due to movement of the land rather than to a sea wave. At the Kempshot Observatory, St. James, the masonry pier of the transit instrument, resting on solid rock, was found to have been disturbed, so that the west end of the axis was 32" higher than the east end. In Kingston Harbour subsidence of the land was noticed along the shore-line, of more than 24 feet in places, but this appears to have been due to the shaking down of loose accumulations of recent deposits, as there is no indication of a permanent change of level in the centre of the harbour or on land except near the shore-line.

Beside the official report, we have received from Prof. Carmody, of Trinidad, a series of photographs taken in Kingston on the second and third day after the earthquake. Two of these are reproduced, which show the character of

the damage done; this was greatest in the case of walls facing east, those facing north or south being generally uninjured. A noteworthy peculiarity was the fact that arched openings seem to have withstood the shock while



FIG. 1.—Railway station wall facing south.

the rest of the wall was destroyed; as there is no form of construction less suited than the arch to withstand the strains set up by an earthquake shock, this can only be



FIG. 2.—Typical north and south narrow street.

ascribed to the badness of material used for building, the arches having stood owing to the necessity for using better material and more skilled workmanship in their construction.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

By the will of the late Mr. A. H. Blount, lord of the manor of Orleton, Hereford, who died in London on June 17, Yale University will receive a bequest the value of which, after payment of duties, &c., will amount to about 80,000l.

THE new session of Birkbeck College, London, will be opened on Monday, September 30, when an address will be given by Mr. G. G. Chisholm. The laboratories will afterwards be open to inspection, and demonstrations will be given. There will be an annual exhibition of students' works on Friday, Saturday, and Monday, September 27, 28, and 30.

THE Department of Agriculture and Technical Instruction for Ireland will next month, award not more than three commercial scholarships to young men having a